DOCUMENT RESUME

ED 213 508 PS 012 695

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TITLE The Comprehension and Use of Self-Control Strategies for Delay Tolerance in Adjusted and Behaviorally-Disordered Kindergarten Children.
PUB DATE Apr 81
GRANT MH-15748-02
NOTE 18p.; Paper presented at the Annual Meeting of the Eastern Psychological Association (52nd, New York, NY, April 22-25, 1981).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Aggression; *Behavior Problems; Cognitive Ability; Comparative Analysis; *Comprehension; *Delay of Gratification; Kindergarten; *Kindergarten Children; Mediation Theory; Metacognition; *Performance Factors; *Self Control
IDENTIFIERS Cognitive Research

ABSTRACT

In order to investigate the relationship between problems in behavioral control and children's capacity to utilize mediational strategies for self control, the responses of a group of disruptive (N=20) and nondisruptive (N=20) kindergarten children were compared in their approach to delay of gratification tasks. Subjects were compared on three forms of potential deficiencies detrimental to mediated task performance: (1) a comprehension deficiency--in which situation requirements and effective strategies are not understood; (2) a production deficiency--in which requirements are understood but effective strategies are not spontaneously produced; and (3) a mediational-control deficiency--in which requirements are understood and an effective strategy is produced, but behavior is not coordinated with that strategy. Results indicate that disruptive kindergarten children exhibit a deficiency on a composite measure of their ability to comprehend delay task demands and utilize mediational strategies for delay. Specifically, disruptive children exhibit a deficiency in the comprehension of situational contingencies and in the comprehension of the influence of two important strategies for delay, as well as a mediational-control deficiency when utilizing self-generated strategies. (Author/MP)

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The Comprehension and Use of Self-Control Strategies for Delay Tolerance in Adjusted and Behaviorally-Disordered Kindergarten Children

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Paper presented at the 52nd Annual Meeting of the Eastern Psychological Association. New York, April, 1981. Preparation of this report was carried out under the support of Postdoctoral Grant MH 15748-02.

Acknowledgements

This research was based on a dissertation submitted to Temple University in partial fulfillment of the Ph.D. degree. The author gratefully recognizes the contributions of Morris Chandler, the author's major advisor, Suzanne Miller, who provided major assistance in conceptualization and design, and David Goldstein and James Larimer, who served as committee members. Special acknowledgement is due Walter Mischel who provided invaluable contributions throughout the developmental stages of the research and supplied advice in interpretation of the results.

Increasing attention in childhood psychopathology has turned to the role of cognitive mediation in behavioral control and self-regulation. In three major areas of research, investigators have reported a relationship between effective use of cognitive mediation and behavioral control and social adjustment. In one area, cognitively impulsive children and aggressive boys have been found to use self-guiding speech less effectively than adjusted children while directing their actions in such tasks as the Matching Familiar Figures Test and finger tapping speed tests (Meichenbaum & Goodman, 1969; Camp, 1977). In a second related area, intervention studies which have trained children to utilize self-guiding speech report improvements in the classroom adjustment of hyperactive and impulsive children after training (Meichenbaum & Goodman, 1971; Kendall & Finch, 1976, 1978). And, in a third area, Mischel (1980) has reported that children's delay of gratification is significantly affected by the ways in which they think about rewards for which they are waiting. For example, it is best to think of topics unrelated to the rewards or, if thinking about rewards, consider their unarousing qualitities.

Suggestions drawn from this research state that children with behavioral control problems and social adjustment problems of an impulsive or aggressive nature exhibit those problems because of deficiencies in the use of self-guiding cognitive mediators. Although a strong case is made with the previous research, the empirical evidence for a direct relationship between social adjustment and mediation use is missing. No previous study has included a direct study of the mediational capabilities of children varying in

behavioral control problems as they respond to a task relevant to their social adjustment, such as a delay of gratification task.

The present study sought to directly investigate the relationship between problems in behavioral control and children's capacity to utilize mediational strategies for self-control. The responses of a group of disruptive and nondisruptive kindergarten children were compared in their approach to delay of gratification tasks. The study investigated three forms of potential deficiences detrimental to mediated task performance: (1) a comprehension deficiency—in which situation requirements and effective strategies are not understood; (2) a production deficiency—in which requirements are understood but effective strategies are not spontaneously produced; and (3) a mediational-control deficiency in which requirements are understood and an effective strategy is produced, but behavior is not coordinated with that strategy.

Following suggestions, disruptive children compared to nondisruptive children were expected to exhibit a deficiency in the comprehension of delay situations and effective strategies, a deficiency in the self-generated production of effective strategies during a delay tolerance task, and a deficiency in the coordination of responses with an effective strategy during a delay tolerance task.

Method

Subjects were 40 kindergarten children divided into two groups. One group consisted of 20 children rated as disruptive by teachers. (They were in the upper decile on classroom distribution scores on the aggressiveness factor of the Children's Behavior Form, Lorion, Barker, Cahill, Gallagher, Pasons, &

Kaufki, 1981). The second group consisted of 20 children with no adjustment problems. Groups were matched on age, sex, class membership, and school readiness.

Children were individually assessed in three tasks. To evaluate for comprehension deficiencies four stories were developed which described situations in which a child had the option to wait for a preferred food reward or act to get a less-preferred food immediately. An inquiry procedure was used to assess comprehension. For situational comprehension, two questions about story details and three about contingencies for waiting and not waiting were read after each story. For strategy comprehension, eight pairs of alternative strategies were used. On each pair, one alternative facilitated delay while the other hindered delay. Subjects selected the alternative that would make waiting easier. (Figure 1 lists the eight types of strategies used with delay-facilitating and delay-hindering alternatives.) Measures collected

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Insert Figure 1 about here

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from subject responses were: (1) the number of detail questions answered correctly; (2) the number of contingency questions answered correctly; and (3) the number of delay-facilitating alternatives chosen. (Responses to detail and contingency questions were independently rated for correctness by two judges. Interrater reliability correlations were .98 and .94 respectively.)

To evaluate children's production of strategies, a delay of gratification task with a modification suggested by Mischel was used (Mischel, 1974; Mischel & Ebbesen, 1970). Children sat alone at a table in a vacant room

during this task. The experimenter left the room for up to 10 minutes. Children had the option to wait for the experimenter to return on his own and receive a preferred food reward (a large roll of candy) or, by ringing a bell, signal the experimenter to return immediately with a less-preferred food (a roll of candy half as large as the first). Children were instructed to tell all of their thoughts to a clown, called Mr. Big Ears, during the task. The recorded voice of Mr. Big Ears and instructions encouraged children to think out loud while waiting. [A recorded series of statements played from a hidden speaker represented the voice of Mr. Big Ears. He told children he would like to hear their thoughts and encouraged them to continue speaking at two-minute intervals during the delay period. This is a modified version of Mischel's "Mr. Talk Box" procedure (Mischel, 1974, p. 267).] A hidden recorder collected children's verbalizations. Two judges independently classified statements (from transcripts) as Delay-Enhancing (i.e., statements unrelated to rewards or difficulties of waiting), Delay-Inhibiting (i.e., statements about the good taste of rewards or the length of time waited), or Inaudible-Minimal Content Statements. (Figure 2 lists the types of statements in each category. A manual for scoring is available from the author. Interrater reliabilities ranged from .92 to .99.)

Insert Figure 2 about here

Delay tolerance was measured as the time from the experimenter's exit to the time a subject rang the bell, up to 10 minutes.

A second delay of gratification procedure utilizing Mr. Big Ears assessed mediational-control abilities. In this second task, children were instructed

to say a specific effective strategy whenever they heard a high pitched tone that sounded every 30 seconds. The effective statement was: "I will wait and talk about (a favorite game)."

In sum, three tasks were used: a story-inquiry procedure to analyze comprehension of delay situations and strategies, one delay of gratification procedure to assess production of self-generated strategies and the effects of these strategies on delay, and a second delay task to assess coordination of delay behavior with an effective strategy.

Results

Data were first analyzed with a multiple analysis of variance (MANOVA) that included all of the variables measured. (Variables entered were: the number of detail questions correct, the number of delay facilitating strategies selected, delay tolerance with self-generated strategies, proportion of time filled with self-generated speech, proportion of statements that were Delay-Enhancing, and delay tolerance with the experimenter provided strategy.)

A significant group difference was found with the MANOVA, $F(7,30) = 3.57$, $p < .01$. Disruptive subjects had a lower score than nondisruptive subjects on the composite measure, indicating a lesser facility in understanding and utilizing mediational strategies.

Univariate comparisons, reported in Table 1, were conducted after the MANOVA.

Insert Table 1 about here

In the evaluation for comprehension, disruptive subjects answered significantly fewer contingency questions correctly than nondisruptive subjects.

No difference was found in the number of details. No difference was found in the total number of delay-facilitating strategies selected, but when data were analyzed for individual strategy types, two important differences were found. Disruptive subjects compared to nondisruptive subjects had a greater preference to look at food rewards versus covering them or not looking at them and a greater preference to think about taste of food rewards versus topics unrelated to the rewards. Both of these are delay-hindering alternatives (Mischel, 1980). Therefore, a comprehension deficiency in disruptive subjects' responses was found for contingencies and for two important strategies for delay.

Under the self-generated strategy conditions, the disruptive subjects delayed over three minutes less than their nondisruptive peers. This was true even though both groups produced similar high proportions of Delay-Enhancing statements. The expectation was that disruptive subjects would tolerate delay for a shorter period of time but that they would do so while producing fewer Delay-Enhancing Statements. That their shorter delay tolerance was associated with a high proportion of Delay-Enhancing statements suggests that they did not coordinate delay behavior with their self-generated strategies. Several subsequent analyses supported this interpretation. These results indicate that disruptive subjects exhibit a mediational-control deficiency when using self-generated strategies.

In contrast, when both groups used the experimenter-provided strategy, delay tolerance did not differ. In this case, disruptive subjects tolerated delay as well as nondisruptive subjects. Post-hoc analysis indicated that disruptive subjects significantly improved their delay tolerance when using

the experimenter-provided statement. Nondisruptive subjects maintained the same level of delay tolerance.

Discussion

The results indicate that disruptive kindergarten children exhibit a deficiency on a composite measure of their ability to comprehend delay task demands and utilize mediational strategies for delay. Specifically, disruptive children exhibit a deficiency in the comprehension of situational contingencies and comprehension of the influence of two important strategies for delay and also a mediational-control deficiency when utilizing self-generated strategies.

The results demonstrate that previously reported deficiencies found in the problem-solving responses of behaviorally-disordered children are also found in a more socially-relevant, self-control situation. This supports the idea that mediational capabilities are an important element of behavior disorders. In addition, the results add to previous research by specifying what types of deficiences are most important. The information from this study suggests that programs which train children in the use of self-guiding speech could focus efforts on teaching ways to attend to situational contingencies, the facilitating effects of certain strategies, and how to coordinate behavior with strategies already available in children's repertoires. Interestingly, in specifying comprehension of contingencies as a source of group differences, the findings replicate emphasis of studies on children's social problem solving.

In such studies, impulsive children are found to have problems in understanding the consequences of their and others' actions and consequential thinking is stressed in efforts to improve adjustment. The contingency questions asked children about consequences of actions in delay situations.

That disruptive subjects made more errors on the questions, provides support for the essential role of consequential thinking in social adjustment.

The findings also contribute to the research of Mischel and colleagues on delay of gratification. In several recent talks and papers, Mischel has reported on children's metacognitive knowledge about delay rules. In children from preschool to the sixth grade, Mischel reports that children become increasingly aware of the effectiveness of strategies for delay (cf. Mischel, 1980; Mischel, Mischel, & Hood, Note 1). The present study indicates that the distinction in knowledge of delay rules can also be found within age groups and that they are related to differences in self-control behavior. A developmental distinction may be present between disruptive and nondisruptive children in their knowledge of delay rules. It would be valuable to explore this question.

Finally, a result with unique implications concerns the comparison of delay tolerance under self-generated strategies and delay tolerance under an experimenter-provided strategy. When producing self-generated strategies, disruptive children did not seem able to utilize them to control their attentive behavior and, in turn, their delay behavior. In contrast, when producing a strategy that specifically guided their actions (i.e., "I will wait and talk about a game."), they were able to control their behavior as well as nondisruptive children. In effect, the disruptive children are able to utilize mediational strategies for self-control, but not those which they produce spontaneously. They seem to require the structure of a specific direction and the cues to use it to help them wait. In effect, they do not have an internalized means of control. That this was found in a setting that

approximated spontaneous use of strategies, stresses the importance of studying naturally occurring differences in mediation use.

For the future, several areas appear fruitful. For our part, investigations of familial correlates of strategy comprehension and coordination of behavior with self-generated strategies are intended as are investigations of the associations of developing time concepts and representational competence with effective medication use in delay tolerance.

Reference Note

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Type of Strategy	Delay-Facilitating Alternative	Delay-Inhibiting Alternative
1. Amount of Distance from Reward	Waiting out of the vicinity of rewards.	Waiting in close proximity of rewards.
2. Amount of Activity During Delay	Pleasant activity while waiting.	Just sitting, no other activity.
3. Amount of Self-Talk	Engaging in self-talk.	Waiting quietly, not talking to oneself.
4. Distracting vs. Consummatory Thoughts[a]	Pleasant thoughts unrelated to rewards.	Thoughts of the taste of rewards.
5. Covering/Not Looking vs. Viewing[a]	Keeping rewards out of sight.	Looking at rewards.
6. Task Contingency vs. Consummatory Thoughts	Review of contingencies for waiting and not waiting.	Taste of rewards.
7. Reward Transformation vs. Distracting Thoughts	Thinking about similarities of rewards to other objects on the basis of color or shape.	Pleasant thoughts unrelated to rewards.
8. Reward Transformation vs. Not Thinking about Rewards	See #7.	Keeping rewards out of of thoughts.

[a]Based on preference comparisons by Mischel, Mischel, and Hood (Note 1).

Figure 1. List of types of strategies studied in the comprehension evaluation.

Delay-Enhancing Statements

1. Consequence-oriented thoughts - mention contingencies for waiting and not waiting or compare rewards.
2. Intentions for waiting - include intentions to wait or not ring the bell.
3. Distracting thoughts - statements on topics unrelated to waiting or candy.
4. Planning thoughts - plan direction of thinking or actions during the waiting period.

Delay-Inhibiting Statements

1. Reward-oriented thoughts - reference to the taste of the candy, desire to have candy immediately.
2. Intentions to ring the bell - include intention to end the waiting period.
3. Frustration statements - reference to frustrating aspects of delay, e.g., length, difficulty.

Inaudible-Minimal Content

1. Garbled statements or one or two word sentences that are vague in meaning.

Figure 2. Self-generated statement categories and definitions

Table 1

Means, Standard Deviations, F Values for Univariate Group Comparisons and Standardized Discriminant Function Coefficients

Variable	Disruptive M	Disruptive SD	Nondisruptive M	Nondisruptive SD	F	Discriminant Function
Comprehension						
Details	5.32	1.45	5.68	1.11	.77	-.315
Contingencies	7.58	1.95	9.74	1.41	15.27**	.690
Strategies	17.32	2.69	16.89	2.35	.26	.377
Production						
Production Time	5.75	3.57	8.92	2.51	10.01*	.840
Speech[a]	.59	.30	.68	.26	1.72	.412
Proportion DE[a]	.87	.17	.78	.19	.07	-.296
Mediational-Control						
Mediational Time	7.57	3.22	7.89	3.39	.09	-.087

Note. Abbreviations: Details = correct detail questions; Contingencies = correct contingency questions; Strategies = total delay-facilitating strategies; Production Time = delay tolerance with self-generated strategies; Speech = proportion of time filled with speech; Proportion DE = proportion of self-generated speech which was Delay-Enhancing; Mediational Time = delay tolerance with experimenter-provided strategy.

[a]Transformed scores were used for anlaysis. Table reports nontransformed scores.

*$p < .005$.

**$p < .001$.